
Space Weather Forecast

Issued on Wednesday, 18 September 2024 at 13:27 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: CME influences waning Day 1 (18 Sep). Ongoing Chance of Moderate flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Low, with only Common-class x-ray flares observed, peaking with one at 18/0344UTC from a sunspot group in the southeast.

There are approximately seven sunspot regions on the visible disc. The largest and most magnetically complex region lies in the southeast quadrant but close to centre disc. This region remains perhaps the most noteworthy group due to its history of producing Strong flares. The next region of note is located in the southwest quadrant, although this is becoming more difficult to analyse due its viewing angle as it approaches the western limb. A number of small spots have developed close to a large unipolar spot in the southeast disc, showing an increase in complexity. This region was responsible for the largest flare in the 24 period. The remaining regions are relatively small and stable.

No Earth-directed Coronal Mass Ejections (CMEs) were observed on available coronagraph imagery during the period

Solar Wind / Geomagnetic Activity: Solar wind parameters displayed the waning effects of enhancement from a CME, which arrived late on the 16 Sep. Solar wind speeds started the period around 520 km/s and have been on a generally gradually declining trend with speeds of 400-450 km/s between 18/000-0800 UTC. In recent hours the winds have fluctuated between slightly elevated and elevated levels and at time of issue are around 430 km/s. The Earth's magnetic field, IMF, was moderate, having declined from strong levels before the start of the period. The important north-south component, was predominately negative (southward) until 18/0140 UTC following the CME arrival, varying between +8 and -10nT. Between 18/0140-0840 UTC the component was weakly positive (northward), since then the winds have weakly fluctuated but tended towards negative.

Geomagnetic activity was initially at G1/Minor Geomagnetic Storm (Kp 5) levels before easing Unsettled (Kp3) to Active (Kp4). Since 18/0300 UTC, activity has been Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: Solar radiation was at S1/Minor Solar Radiation Storm levels initially, peaking around 17/1200 UTC. Levels fell below the S1 threshold around 17/1615UTC and are now close to background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is forecast, with a chance of Moderate-class flares. There is a slight chance of an isolated Strong-class flare from the southeastern sunspot group given its history. No significant regions are expected to arrive in the period, although one of the two notable sunspot groups will cross the western limb late Day 3 and during Day 4 (20-21 Sep). The flare risk is deemed largely constant as a result.

Solar Wind / Geomagnetic Activity: CME influence from the arrival late on 16 Sep has now Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

largely waned. No other CMEs feature in the current forecast.

Wind speeds are currently at Slightly Elevated levels. Some enhancement to wind speeds is possible later Day 1 and during Day 2 (18-19 Sep) which may see winds increase to Elevated levels, around 500 km/s. Otherwise, the overall trend is for winds to fall to slow ambient levels.

Geomagnetic activity is most likely to be Quiet to Unsettled (Kp 0-2) during the period. Later Day 1 and into Day 2 however, there is a Chance of Active (Kp 4) intervals and a Slight Chance of a G1/Minor Geomagnetic storm (Kp 5) interval resulting from the potential connection to a stream of coronal hole fast winds.

Energetic Unsettled or Active on Day 1 (18 Sep), with a slight chance of reaching G1/Minor Storm levels if the fast wind from CH70/+ occurs late on Day 1 or Day 2 (18-19 Sep). Quiet conditions are likely from Day 3 (20 Sep).

Energetic Particles / Solar Radiation: Solar radiation should continue to decline on Day 1 (18 Sep) and return to background by Day 2 (19 Sep). Slight chance of S1 throughout should any significant flares occur.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	Yes	10	10	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	Yes	20	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)